REMARKS

I. Claims Status

Claim 41 is new and serves to rewrite dependent claim 10 in independent form.

Claims 39 and 40 are amended herein to replace the linking term "comprising" with "consisting".

Claims 1-7, 9-12, and 39-41 are pending.

II. Claim Objection

In the July 11, 2003 Office Action claim 10 was objected to as being dependent upon a rejected base claim. Examiner Toomer indicated that the claim would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response, applicant has rewritten claim 10, as independent claim 41, which includes all of the limitations of base claims 1 and 10.

III. Claim Rejections Under 35 U.S.C.§ 103(a)

In the July 11, 2003 Office Action, Examiner Toomer rejected claims 1-7, 9-12 and 39-40 under 35 U.S.C.§ 103(a) as being unpatentable over United States Patent Number 4,182,824 issued to Suzuki et al., (hereinafter referred to as "Suzuki").

In response, applicant traverses the rejection and requests reconsideration of all pending claims based on the ensuing remarks.

Examiner Toomer, relies on Suzuki's disclosures at column 1, lines 42-58; column 3, lines 46-53; and column 4, lines 55-66, for the present obviousness rejection and reasons that "Suzuki teaches a **solution** (emphasis added), wherein the silanes are **prepared** in a hydrocarbon solvent, namely benzene." (reproduced below from July 11, 2003 Office Action).

> **Suzuki teaches silanes substantially as claimed in the present invention. Suzuki renders obvious the claims of the present invention when R is alkyl, aryl or alkoxy and when Q_1 –Q_3 is alkyl (see col. 1, lines 42-58). Suzuki teaches a solution**

wherein the silanes are prepared in a hydrocarbon solvent, namely benzene (see col. 3, lines 46-53; col. 4, lines 55-56).

Applicant's claims 1-7 and 9-12 are directed to a precursor solution for chemical vapor deposition, comprising a hexa-coordinated silicon ß-diketonate and a solvent component.

Well known in the art, is that a solution comprises a homogenous mixture of at least one solvent and one solute. McGraw Hill's **Dictionary of Scientific and Technical Terms**, defines solution as "a single, homogenous liquid, solid, or gas phase that is a mixture in which the components (liquid, gas solid, or combinations thereof) are uniformly distributed throughout the mixture[1]". (*See*, Appendix A for copy of reference.)

Suzuki teaches a **reaction mixture** including as components, at least halogenated silane, benzene, beta-diketonate, hydrochloric acid by product, acid acceptor such as pyridine and the salt of the hydrochloric acid and acid acceptor. Subsequent to combining the various components, Suzuki's mixture is refluxed for 2 hours at 80°-90°C, cooled, hydrochloric acid salt of acid acceptor removed by filtration, and benzene and unreacted acid acceptor removed by distillation. (*See* column 3, lines 46-54 and Example 1, Column 4).

According to MPEP 2141.02 a prior art reference must be considered in its entirety, including disclosures that teach away from the claims.

Suzuki's reaction mixture, in its entirety, includes a **hydrochloric acid salt of acid acceptor,** which is **removed by filtration. Suzuki's reaction mixture is not a solution** (emphasis added) as it is not homogenous. Moreover, Suzuki's reaction mixture contains a salt, which can be filtered from the mixture. Certain individual features from the reference may not be arbitrarily chosen (while equally arbitrarily discarding other disclosed features) to merely match features of the rejected claims. Suzuki must be considered in its entirety.

Examiner Toomer maintains the present obviousness rejection by reasoning that **intended use is given no patentable weight in claims that are directed to the composition per se,** while simultaneously stating,

[1] Sybil P. Parker , McGraw-Hill Dictionary of Scientific and Technical Terms, Fourth Edition, 1989.

> **Suzuki differs from the claims in that he does not specifically teach that the silane composition is used as a chemical deposition vapor precursor solution.**

Contrary to the Examiner Toomer's reasoning, MPEP 2111.02 **Weight of Preamble**, provides for situations where the preamble is essential to the invention,

> **The preamble is not given the effect of a limitation unless it breathes life and meaning into the claim. In order to limit the claim, the preamble must be "essential to point out the invention defined by the claim."** ***Kropa v. Robie*****, 187F.2d 150, 152, 88 USPQ 478,481 (CCPA 1951).**
>
> **In** ***Kropa v. Robie*****, 187F.2d 150, 152, 88 USPQ 478,481 (CCPA 1951), a preamble reciting "An abrasive article" was deemed essential to point out the invention defined by claims to an article comprising abrasive grains and a hardened binder and the process of making it. The court said that "it is only by that phrase that it can be known that the subject matter defined by the claims is comprised as an abrasive article. Every union of substances capable of** ***inter alia*** **of use as abrasive grains and a binder is not an 'abrasive article.' " Id. at 481, 187 F.2d at 152. Therefore, the preamble served to further define the structure of the article produced.**

Similarly, the preamble, **"A CVD precursor solution"**, is essential to point out and define the instant invention directed to a solution comprising **a solvent component and a hexacoordinated silicon beta-diketonate.** It is only by the phrase "A CVD precursor solution" that it can be known that the subject matter defined by the claims is comprised as a CVD precursor solution. Every union of substances capable of use as CVD precursor solutions, among other things, of use **as a solvent component and a hexacoordinated silicon beta-diketonate,** is not a CVD precursor solution.

As is well known in the art of CVD, source reagents (precursor solutions), must meet stringent quality control requirements to qualify for use in chemical vapor deposition processes. One specific requirement is that impurity levels not exceed predefined specifications, as incorporation of same into, for example, a semiconductor device, leads to device failure.

Therefore, applicant's preamble serves to further define the structure of the article produced.

The following excerpt from page 92, Section 3.2, **Handbook of Chemical Vapor Deposition, Second Edition**[1], a copy of which was provided in applicant's May 1, 2003 Response, serves to validate applicant's case in point as to the stringent purity requirements for chemical vapor deposition precursor solutions and that which is well known in the applied art.

3.2 Reactant Purity and Contamination

> **The requirement placed on the performance and reliability of CVD coatings are continuously upgraded, For one thing, this means the need for an ever increasing degree of purity of the precursor materials since impurities are the major source of defects in the deposit. The purity of a gas is expressed in terms of nines, for instance, six nines, meaning a gas that is 99.9999% pure, which is now a common requirement. It is also expressed in ppm (parts per million) or ppb (parts per billion) of impurity content.**

What Suzuki enables and places in the public domain is a **reaction mixture** including as components, at least halogenated silane, benzene, beta-diketonate, hydrochloric acid by product, acid acceptor such as pyridine and the salt of the hydrochloric acid and acid acceptor. Subsequent to combining the various components, Suzuki's mixture is refluxed for 2 hours at 80°-90°C, cooled, hydrochloric acid salt of acid acceptor removed by filtration, and benzene and unreacted acid acceptor removed by distillation. (*See* column 3, lines 46-54 and Example 1, Column 4).

Suzuki fails to teach expressly or inherently, a precursor solution suitable for chemical vapor deposition comprising a hexa-coordinated silane and a solvent. Moreover, Suzuki fails to place a precursor solution, useful for chemical vapor deposition of silicon containing gate dielectric thin films in the possession of the public. Still further, applicant's claims, in their current form, would not exclude others from making using or selling that, which is taught by Suzuki.

Suzuki does not provide any 35 U.S.C.§ 103(a) derivative basis for a precursor solution comprising a hexa-coordinated silicon beta-diketonate composition and a solvent component. Accordingly, applicant respectfully requests the withdrawal of the present 35 U.S.C.§ 103(a) rejection and reconsideration of all currently pending claims.

Regarding claims 39 and 40, Examiner Toomer states,

[1] Pierson, Hogh O. **Handbook of Chemical Vapor Deposition. Second Edition. New York: Noyes, 1999.**

The silane compounds disclosed in Suzuki encompass those of present claims 39 and 40 when R is alkoxy or methyl and the Q groups are alkyl.

Suzuki's compositions are used to enhance adhesion of curable materials to substrates.

Based on MPEP 2144.08 II,

The fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a prima facie case of obviousness.

Suzuki discloses only three ß-diketonate ligand structures (column 3) comprising 5 or 6 carbons. Suzuki fails to disclose a single ß-diketonate having 11 carbons as in the silane compositions presently claimed by applicant.

Applicant's claimed compositions were discovered by the present inventors when searching for compositions useful as CVD precursors for depositing silicon containing gate dielectric thin films. Ideal precursors lead to silicon oxide films of high purity, having high-density characteristics. The temperature regime at which a chemical vapor deposition process occurs (at temperatures below 600°C) is of critical importance.

The scope of Suzuki disclosure differs significantly from the present invention in that Suzuki teaches silanes for adhesion enhancement, while the present invention teaches silanes for chemical vapor deposition. Accordingly, as there is no link between adhesion enhancement for curable materials and precursors for chemical vapor deposition of silicon containing gate thin films, what motivation is there to modify Suzuki's 5 or 6 carbon silane compositions to arrive at applicant's novel compositions as presently identified by amended claims 39 and 40.

Suzuki does not provide appropriate 35 U.S.C.§ 103(a) basis for applicant's novel compositions, namely, $(t\text{-}OBu)_2Si(thd)_2$ and $(CH_3)_2Si(thd)_2$. Accordingly applicant respectfully requests the withdrawal of the present 35 U.S.C.§ 103(a) rejection and reconsideration of claims 39 and 40.

The foregoing evidence is sufficient to place all pending claims in condition for allowance. Therefore, removal of the instant rejection pursuant to 35 USC § 103(a) is respectfully requested.

IV. Request for Continued Examination Under 35 U.S.C.§132(b)

A Request for Continued Examination is concurrently filed herein under 35 U.S.C.§132(b).

V. Fees Due and Payable

Amendment of claims herein, includes the addition of one independent claim, bringing the total number of pending claims to 14, 6 of which are independent. As applicant has previously paid for 34 claims, and 5 independent claims, a net fee of (1 x $84) $84.00, is due in connection with the addition of one independent claim. Such fee is hereby authorized to be deducted from the Deposit Account No. 50-0860 in the name of applicant, Advanced Technology Materials, Inc., 7 Commerce Drive, Danbury, CT 06810.

Additionally, in connection with applicant's Request for Continued Examination under 35 U.S.C.§132(b), a fee of $750 as specified in 37 CFR 1.17(e), is hereby authorized to be deducted from the Deposit Account No. 50-0860 in the name of applicant, Advanced Technology Materials, Inc., 7 Commerce Drive, Danbury, CT 06810.

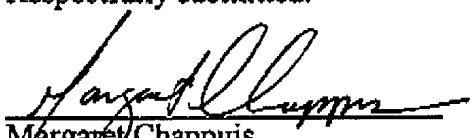
Should the Office determine any additional fees are due in connection with the entry of this amendment, the Office is hereby authorized to deduct such fee from the above-identified deposit account.

Conclusion

Based on the foregoing, claims 1-7, 9-12, and 39-41 as amended herein and now pending in this application, embody novel and nonobvious subject matter and such claims now are in form and condition for allowance. Favorable action therefore is requested.

In the event that any issues remain outstanding, incident to the formal allowance of the Application, the Examiner is requested to contact the undersigned agent at (203) 794-1100 ext. 4184 to discuss their resolution, so that this application may be passed to issue at an early date.

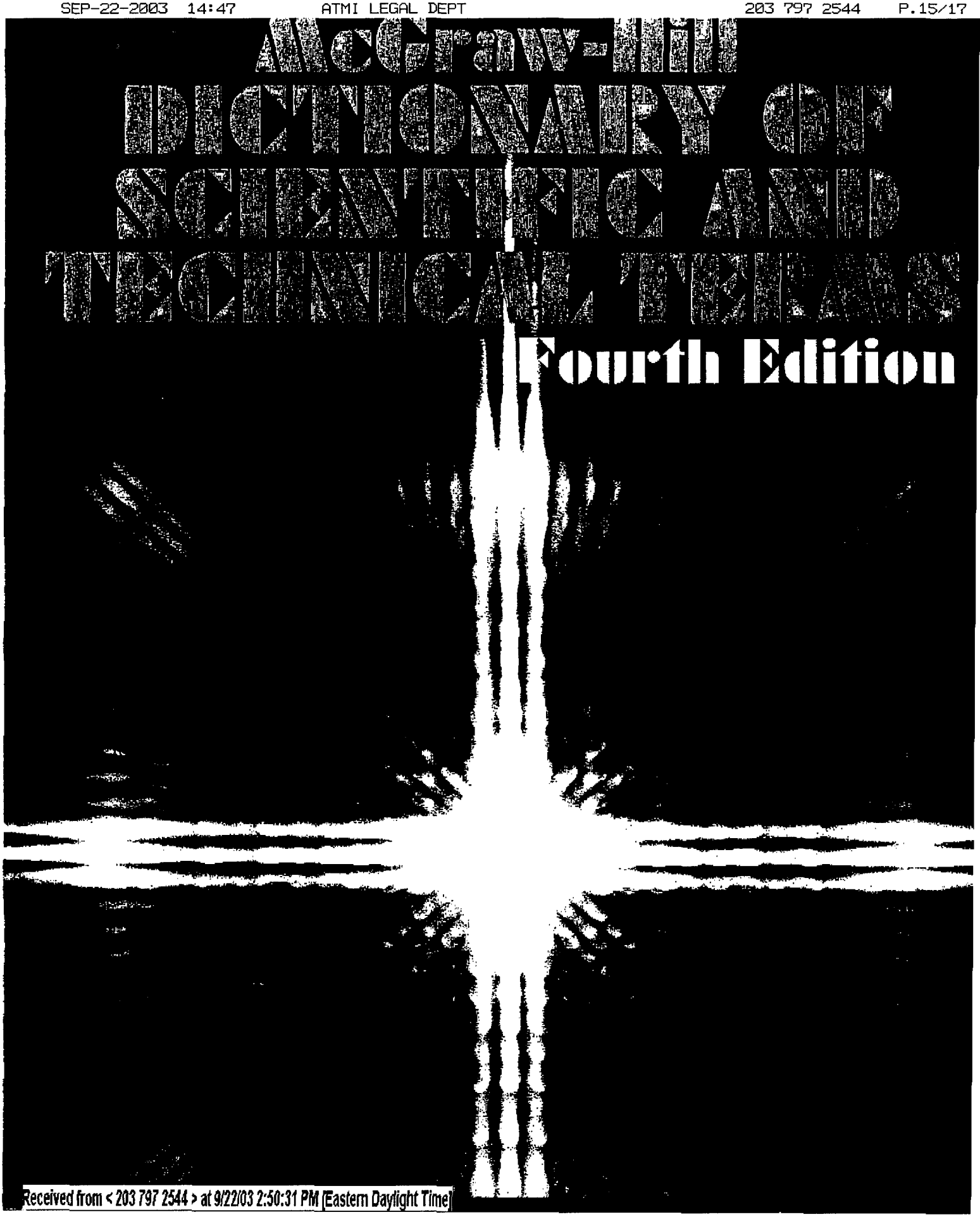
Respectfully submitted.



Margaret Chappuis
Registration No. 45,735
Agent for Applicants

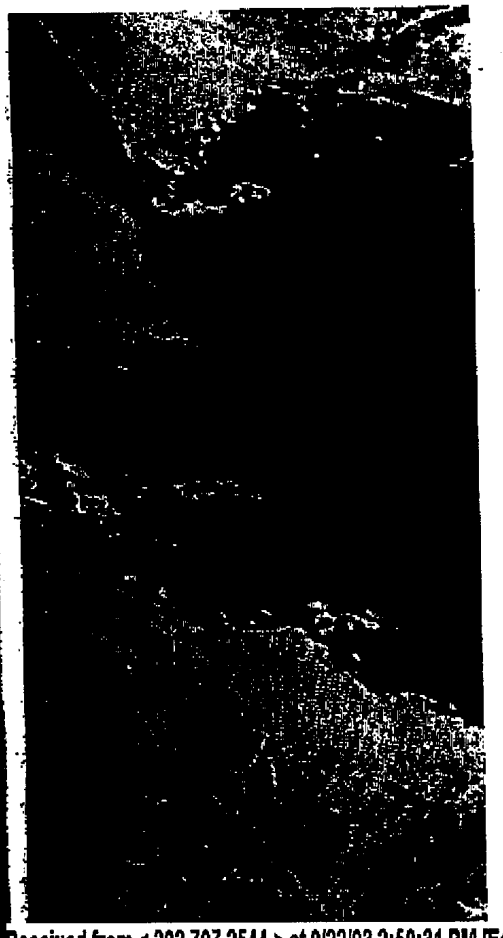
Advanced Technology Materials Inc.
7 Commerce Drive
Danbury CT 06810
Telephone (203) 794-1100 ext 4184
Facsimile (203) 797-2544
Attorney Docket No. 478

APPENDIX A



McGraw-Hill DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

Fourth Edition



Sybil P. Parker
EDITOR IN CHIEF

McGRAW-HILL BOOK COMPANY

New York
St. Louis
San Francisco

Auckland
Bogotá
Caracas
Colorado Springs
Hamburg
Lisbon
London
Madrid
Mexico
Milan
Montreal
New Delhi
Oklahoma City
Panama
Paris
San Juan
São Paulo
Singapore
Sydney
Tokyo
Toronto

y product constant [PHYS CHEM] A type of simequilibrium constant, K_{sp}, defined for and useful for in between solids and their respective ions in solution; mple, the equilibrium

$$AgCl(s) \rightleftarrows Ag^+ + Cl^-, [Ag^+][Cl^-] \simeq K_{sp}$$

g^+] and $[Cl^-]$ are molar concentrations of silver ions ride ions. { ˌsäl·yəˈbil·əd·ē ˌprād·əkt ˌkän·stənt }
y test [ANALY CHEM] 1. A test for the degree of of asphalts and other bituminous materials in solch as carbon tetrachloride, carbon disulfide, or petro- 2. Any test made to show the solubility of one in another (such as liquid-liquid, solid-liquid, gassolid-solid). { ˌsäl·yəˈbil·əd·ē ˌtest }
[CHEM] Capable of being dissolved. { ˈsäl·yə·bəl }
arbital *See* sodium barbital. { ˈsäl·yə·bəl ˈbärˌbi
astor oil *See* Turkey red oil. { ˈsäl·yə·bəl ˈkas·tər
tting oil [MATER] A petroleum oil containing an g agent to make it mix easily with water; used as a metal-cutting tools. { ˈsäl·yə·bəl ˈkəd·iŋ ˌȯil }
ate *See* sodium silicate. { ˈsäl·yə·bəl ˈglās }
troction *See* pyroxylin. { ˈsäl·yə·bəl ˈgänˌkar·ən }
digo blue *See* indigo carmine. { ˈsäl·yə·bəl ˈin·dəˌgō
trocellulose *See* pyroxylin. { ˈsäl·yə·bəl ˌnī·trō ˈsel·
[MATER] An oil that readily forms a stable emulfoidal suspension in water. Also known as emul- { ˈsäl·yə·bəl ˈȯil }
arch [MATER] A group of water-soluble polymers starch, such as the starches derived from corn or acetylation, acid hydrolysis, chlorination, or by nzymes to form starch acetates, ethers, and esters; ile sizing agents, emulsifying agents, and paper ˈsäl·yə·bəl ˈstärch }
oil The upper part of a soil profile, composed of rizons in mature soil. Also known as true soil.
[CHEM] The substance dissolved in a solvent. { ˈsäl·
ortmentation [BOT] The sequestering of a lt in a vacuole so that the salt does not poison the ˈsȯlt ˌkōm,pärt·mənˈtā·shən }
[CHEM] A single, homogeneous liquid, solid, or ar is a mixture in which the components (liquid, combinations thereof) are uniformly distributed e mixture. { səˈlü·shən }
mic [ELEC] A nonbrittle, inorganic ceramic ting that can be applied to wires at a low temperles include ceria, chromia, titania, and zirconia. ˈsir·əmˌik }
ing [TEXT] Adding dye to the chemical com- mixture just before extrusion. Also known as dope ˈdōˌiŋ }
[PETRO ENG] Gaseous reservoir hydrocarbons d reservoir hydrocarbons because of the pre- in the reservoir. Also known as dissolved ˈgas }
ve *See* internal gas drive. { səˈlü·shən ˌgas
eservoir [PETRO ENG] Oil reservoir initially bubble-point pressure of the gas-oil mixture, primarily by the expansion of the oil and its Also known as dissolved-gas reservoir. ˈrez·əvˌwär }
[GEOL] One of a series of continuous, subdeveloped on an inclined or vertical surface of ogeneous rock (such as the limestone walls e slow corroding action of trickling water. }
eatment [MET] Heating and holding an alture at which one (or more) constituent enters then cooling the alloy rapidly to prevent the precipitating. { səˈlü·shən ˈhēt ˌtrēt·mənt }
[MIN ENG] The extraction of soluble minerals from subsurface strata by injection of fluids, and the controlled removal of mineral-laden solutions. { səˈlü·shən ˌmīn·iŋ }

solution poison [NUCLEO] A soluble nuclear poison, such as boric acid, added to the coolant of a nuclear reactor for purposes of reactivity control; generally used only during shutdown periods, and chemically removed from the coolant prior to resuming operation. { səˈlü·shən ˌpȯiz·ən }
solution pool [GEOL] A pool in a rock that is formed by the dissolution of the rock in ocean water. { səˈlü·shən ˌpül }
solution porosity [PETRO ENG] A generic designation for reservoir-rock porosity created by solution action; some examples are crystalline limestone and dolomite, porous cap rock, and honeycombed anhydrite. { səˈlü·shən pəˌräs·əd·ē }
solution potholes [GEOL] Potholes produced in carbonate rocks by dissolution. { səˈlü·shən ˌpätˌhōlz }
solution pressure [PHYS CHEM] 1. A measure of the tendency of molecules or atoms to cross a bounding surface between phases and to enter into a solution. 2. A measure of the tendency of hydrogen, metals, and certain nonmetals to pass into solution as ions. { səˈlü·shən ˌpresh·ər }
solution process [CHEM ENG] An oil-refining process for separating mercaptans from gasoline by washing with a caustic solution containing organic compounds in which the mercaptans are soluble. { səˈlü·shən ˌprā·səs }
solution transfer [GEOL] A process whereby pressure solution of detrital mineral grains at contact areas is followed by recrystallization on the less strained parts of the grain surfaces. { səˈlü·shən ˌtranz·fər }
solutizer-air regenerative process [CHEM ENG] A petroleum refinery process that is identical to the solutizer-steam regeneration process, except for the regeneration step; the newer units use uncatalyzed air regeneration. { səˈlüˌtīz·ər ˈer rēˈjen·ə·rəd·iv ˌprā·səs }
solutizer-steam regenerative process [CHEM ENG] A petroleum refinery process used to extract mercaptans from gasoline or naphtha; uses solutizers (potassium isobutyrate or potassium alkyl phenolate) in strong potassium hydroxide solution as the selective solvent. { səˈlüˌtīz·ər ˈstēm rēˈjen·ə·rəd·iv ˌprā·səs }
solutizer-tannin process [CHEM ENG] A petroleum refinery process that is an early variation of the solutizer-air regenerative process for extraction of mercaptans from gasoline; uses tannin-catalyzed oxidation for the regeneration step. { səˈlüˌtīz·ər ˈtan·ən ˌprā·səs }
solutrope [CHEM] A ternary mixture with two liquid phases and a third component distributed between the phases, or selectively dissolved in one or the other of the phases; analogous to an azeotrope. { ˈsäl·yəˌtrōp }
solvable group [MATH] A group G which has subgroups $G_0, G_1, \ldots, G_n$, where $G_0 = G$, $G_n =$ the identity element alone, and each G_i is a normal subgroup of G_{i-1} with the quotient group G_{i-1}/G_i Abelian. { ˈsäl·və·bəl ˈgrüp }
solvation [CHEM] The process of swelling, gelling, or dissolving of a material by a solvent; for resins, the solvent can be a plasticizer. { säl'vā·shən }
Solvay process [CHEM ENG] The process to make sodium carbonate and calcium chloride by treating sodium chloride with ammonia and carbon dioxide. { ˈsälˌvā ˌprā·səs }
solvent [CHEM] That part of a solution that is present in the largest amount, or the compound that is normally liquid in the pure state (as for solutions of solids or gases in liquids). { ˈsäl·vənt }
solvent deasphalting [CHEM ENG] A petroleum refinery process used to remove asphaltic and resinous materials from reduced crude oils, lubricating oil stocks, gas oils, or middle distillates through the extractive or precipitant action of solvents. Also known as solvent deresining. { ˈsäl·vənt dēˈasˌfȯlt·iŋ }
solvent deresining *See* solvent deasphalting. { ˈsäl·vənt diˌrez·ən·iŋ }
solvent dewaxing [CHEM ENG] A petroleum refinery process for solvent removal of wax from oils; the mixture of waxy oil and solvent is chilled, then filtered or centrifuged to remove the precipitated oil; the solvent is recovered for reuse. { ˈsäl·vənt diˌwuks·iŋ }
solvent dyeing [TEXT] The dyeing of synthetic textiles by using chlorinated hydrocarbon solvents (such as trichloroethy-